

**Translation**

PATENT COOPERATION TREATY

PCT/EP2003/010895



# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P037116/WO/1	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/EP2003/010895	International filing date (day/month/year) 01 October 2003 (01.10.2003)	Priority date (day/month/year) 31 October 2002 (31.10.2002)
International Patent Classification (IPC) or national classification and IPC B60K 23/08		
Applicant DAIMLERCHRYSLER AG et al.		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>8</u> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>	

Date of submission of the demand 07 May 2004 (07.05.2004)	Date of completion of this report 26 January 2005 (26.01.2005)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2003/010895

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is language of a translation furnished for the purpose of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ The international application as originally filed/furnished

- ☐ the description:

pages \_\_\_\_\_ 1-4, 10-15 \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ 5-9, 7a \_\_\_\_\_ received by this Authority on \_\_\_\_\_ 10 November 2004 (10.11.2004)

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☒ the claims:

pages \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_, as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ 1-7 \_\_\_\_\_ received by this Authority on \_\_\_\_\_ 10 November 2004 (10.11.2004)

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☒ the drawings:

pages \_\_\_\_\_ 1/2-2/2 \_\_\_\_\_, as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

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## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims	1 - 7	YES
	Claims		NO
Inventive step (IS)	Claims	1 - 7	YES
	Claims		NO
Industrial applicability (IA)	Claims	1 - 7	YES
	Claims		NO

## 2. Citations and explanations

Reference is made to the following documents:

D1: DE 42 30 326 A (DANA CORP) 18 March 1993 (1993-03-18)

D2: US-B1-6 347 271 (SHOWALTER DAN J) 12 February 2002  
(2002-02-12)

D3: US-A-4 552 036 (TAKANO TOSHIO ET AL) 12 November 1985  
(1985-11-12)

Independent Claim 11. Novelty

Document D1 is considered the prior art closest to the subject matter of claim 1. It discloses (the references in parentheses are to D1; see figures 1 and 2):

a drive arrangement for an off-road utility vehicle with at least one rear axle (18) that is permanently drivable by a drive motor (14) via a multi-speed sliding gear transmission (12) and one front axle (24), which is operationally linked with the rear axle by an axle switching clutch, and wherein said axle switching clutch (65) is generally engaged and disengaged by hand (by means of switch 34).

The subject matter of claim 1 thus differs from the known drive arrangement in that

the axle switching clutch can also be triggered automatically as a function of engine load and in that the automatic engagement of the axle switching clutch is blocked when the engine load is below a threshold value that is related to a defined fractional value of the maximum engine torque of the driving motor.

Therefore, the present application satisfies the criterion set out in PCT Article 33(2) because the subject matter of the single independent claim, claim 1, is novel in relation to the prior art as defined in the Regulations (PCT Rule 64.1 to 64.3).

## 2. Inventive Step

Proceeding from the cited prior art, the problem to be solved by the present invention can thus be seen as that of developing a drive arrangement according to the preamble of the independent claim such that the components of said drive arrangement (e.g. rear axle) are protected from excessive stresses.

However, the solution according to claim 1 does not appear to be known *per se* from any of the documents of the procedure or to be suggested by the prior art as a whole.

In document D1, as well as in document D3, the axle switching clutch is controlled in response to the slippage of the rear wheels, and there is no suggestion of clutch control as a function of engine torque.

By contrast, document D2 is concerned with the aforementioned problem of increasing the working life of drive components in a vehicle with all-wheel drive and it recommends automatically triggering a shift to the front axle when there is high engine load (see column 1, lines 5-42 and column 3, lines 36-43). The load condition is determined using a quotient of throttle valve position and current vehicle acceleration. Document D2 also does not disclose clutch control as a function of engine torque.

Therefore, the present application appears to fulfill the criterion set out in PCT Article 33(3) because the subject matter of claim 1 appears to involve an inventive step (PCT Rule 65.1 and 65.2).

### 3. Industrial Applicability

The subject matter of claim 1 also appears to satisfy the requirements of PCT Article 33(4), since appears that it can be made and used at least in the field of automotive engineering.

### 4. Claims dependent upon Claim 1

Dependent claims 2-7, the subject matter of which relates to further embodiments of the invention according to claim 1, likewise appear to satisfy the requirements of PCT Article 33(2) to (4).

### 5. Clarity

It emerges from pages 7, 1, 12 and 14 of the description that the current transmission ratio  $i_G$  is taken into account when the axle switching clutch is triggered to engage. This feature also appears to be essential to the

execution of the invention, since the load on the rear axle that is to be protected depends on both the engine torque and the transmission ratio. Controlling the clutch by engine torque thus cannot effectively protect the power train, since the load on the rear axle in low gear is many times higher than in the starting gear when the engine torque is the same.

Since independent claim 1 does not contain the above feature, said claim does not satisfy the requirements of PCT Article 6, in conjunction with PCT Rule 6.3(b), that every independent claim must contain all of the required technical features of the invention.

Furthermore, the aim of the invention is that of preventing excessive loads on the rear axle (page 6, paragraph 3). It is sensibly stated on page 7 that the solution consists in switching to the front axle above a threshold value of engine load. Claim 1, on the other hand, claims that the engagement of the axle switching clutch can be triggered automatically (and not "is triggered") and that the automatic engagement of the axle switching clutch is blocked when the engine load is below a threshold value. The effect of the claimed solution is not entirely clear, since the only effect is that the front axle is not engaged at low engine torques. Above the threshold value, by contrast, when there are high torques, it remains unclear whether the clutch is engaged or not and thus whether the rear axle is effectively protected. This discrepancy in turn renders the claim unclear.

In addition, the reference signs (M) and ( $M_m$ ) in claim 1 are not used consistently throughout the application. On page 14 of the description, M is defined as the current load condition and  $M_m$  as engine torque. This does not

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correspond to the definition in claim 1 and renders claim  
1 unclear.